

Native plant rehabilitation in Hawaii Volcanoes National Park

by Rhonda Loh and Tim Tunison



Students were key to the success of the restoration, collecting millions of native plant seeds.

RESTORING FIRE-DAMAGED 'OHĪ'A WOODLANDS in Hawaii Volcanoes National Park presents a daunting challenge to park managers. Trying to restore formerly dominant but fire-sensitive woody species like 'ohi'a (*Metrosideros polymorpha*) and pukeawe (*Styphelia tameiameia*) is impractical given the widespread abundance of nonnative grasses and the inevitability of future wildfires. Instead, managers have adopted a rehabilitation approach to create a replacement community of fire-tolerant native plants that can survive and ideally spread in the new grass/fire cycle. This approach yielded positive results following the Broomsedge Fire, which occurred on 30 June 2000. By September 2002, visitors who walked through the burn could see signs of the revegetation effort.

Wildfires in the Hawaiian national parks are suppressed as a matter of policy because they inflict severe ecological damage. At Hawaii Volcanoes National Park, fire frequency has increased 3-fold and fire size 60-fold since the invasion and spread of broomsedge (*Andropogon virginicus*), beardgrass (*Schizachyrium condensatum*), and other nonnative grasses beginning in the 1960s. The most severely affected ecosystem is the seasonally dry 'ohi'a woodlands, where nearly two-thirds of the native community has been consumed by fire and replaced by nonnative savannas over the last 25 years. 'Ohi'a and pukeawe suffer high mortality in fire and individuals have difficulty reestablishing themselves after fire. In contrast, fire-adapted nonnative grasses recover vigorously and increase fine fuel loads up to three times more than in adjacent unburned areas, increasing the risk for future wildfires.

The Broomsedge Fire consumed 1,008 acres of 'ohi'a woodland and koa (*Acacia koa*) forest. Through funding provided by the interagency Burn Area Emergency Rehabilitation program, an aggressive campaign to revegetate the burn began within days of control of the fire. The goal in burned 'ohi'a woodlands is to establish fire-tolerant native plants that can survive and spread after future wildfires. Fifteen native species are identified as fire tolerant based on their ability to survive, recover, or recruit from seed after fire. Many of these species were once common to 'ohi'a woodlands but were removed by introduced feral goats that roamed the park over the last two centuries. Goats were eliminated in the mid-1970s, giving managers the opportunity to

restore these important plant communities. The revegetation goal in koa forest is to establish two strips of dense native understory beneath the recovering koa trees to create vegetated fuel barriers that prevent future wildfires from spreading into nearby, biologically rich Kipuka Puauulu and across the park boundary to the Volcano Golf Course Subdivision.

More than 15,000 plants and 3,000,000 seeds of 23 native species have been restored in the burn, including thousands of mamane (*Sophora chrysophylla*) trees and 'a'li'i (*Dodonaea viscosa*) shrubs as well as rare kookoolau (*Bidens hawaiiensis*) and naupaka (*Scaevola kilaueae*) plants. Widespread participation from the local community, visiting students, and conservation groups, along with dedicated staff, has been the cornerstone for the success of the project. By the time the project is completed in June 2003, 31 native species, including 15 fire-tolerant species, will be established through a combination of direct seeding and outplanting into 850 plots scattered across the entire burn. Long-term monitoring will determine whether the plants established in the burn will continue to thrive and ultimately create a native plant community that survives future wildfires. ■

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Following the July 2000 Broomsedge Fire at Hawaii Volcanoes National Park, exotic grasses adapted to fire replaced native 'ohi'a woodlands that are fire-sensitive. The park replanted and reseeded the area with fire-tolerant native vegetation (not shown).